

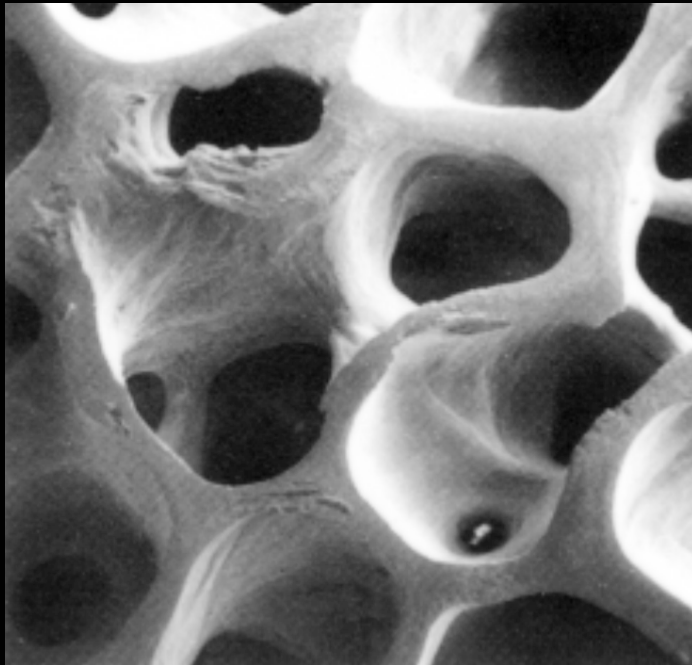
# Walking Competency in Ambulatory Individuals Living in Long-term Care

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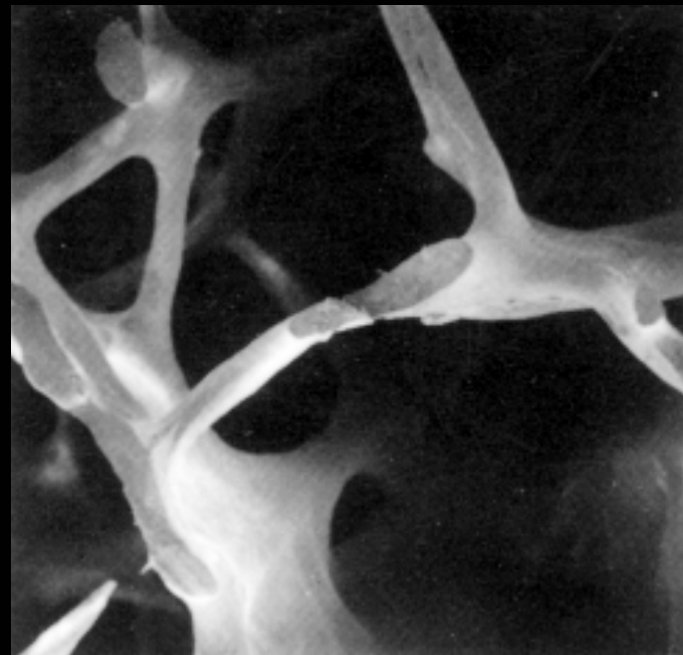
Lora Giangregorio, Bill McIlroy, Eric Roy,  
Alexandra Papaioannou, Lehana Thabane,  
Jonathan D. Adachi

# What is osteoporosis?

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**Normal Bone**



**Porous Bone**

# Economic Burden of Osteoporosis in Canada

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- Healthcare costs were estimated at \$1.3 billion in 1993
- Acute care costs were \$465 million
- Majority of costs due to hip fractures
- \$842 million for LTCF and chronic care

# Consequences of Hip Fracture

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- 25% died within one year of hip fracture
- 24% of survivors were institutionalized
- 40% mortality for those living in LTCFs
- 5% experienced another hip fracture in the follow-up year

# Clinical consequences of hip fractures

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- ◆ Loss of independence, 50% dependent on walking aids
- ◆ Unable to return home
- ◆ Most occur after a fall, about 5% appear to be "spontaneous" fractures.

# Risk Factors for Falls – Intrinsic, Extrinsic, Environmental

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- Impaired cognition
- Depressive symptoms
- Orthostatic hypotension
- Vision
- Balance, gait, muscle strength
- Use of four prescription drugs

*8% risk of falling with no risk factors*

*78% risk of falling with four or more risk factors*

# Physical changes & hip fracture risk

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Factors predictive of risk for hip fracture, independent of BMD<sup>1,2</sup> include:

- ◆ Slower gait speed
- ◆ Difficulty performing heel-to-toe walk
- ◆ Reduced visual acuity
- ◆ Inability to rise from a chair without using arms for support<sup>3</sup>

1. Dargent-Molina P, et al. *Lancet* 1996;**348**:145-149.

2. Dargent-Molina P, et al. *Osteoporos Int* 1999;**9**:188-192.

3. Cummings SR, et al. *N Engl J Med* 1995;**332**:767-773.

# The psychological impact of osteoporosis

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# What can we do to prevent fractures?

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- **Maintain bone health**
  - Target modifiable risk factors
  - Ensure adequate nutrition
  - Emphasize physical activity
  - Pharmacological intervention
- **Prevent falls**

# Fall Prevention

## Interventions likely to be beneficial:

- Health/environmental risk factor screening/intervention
- Muscle strengthening and balance retraining
- Home hazard assessment and modification
- Withdrawal of psychotropic medication
- A 15 week Tai Chi group exercise intervention



# Vitamin D: The Wonder Drug?

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# Recommended Daily Vitamin D Intake

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Age

Daily Intake

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Men & women (19 – 50)

400 IU

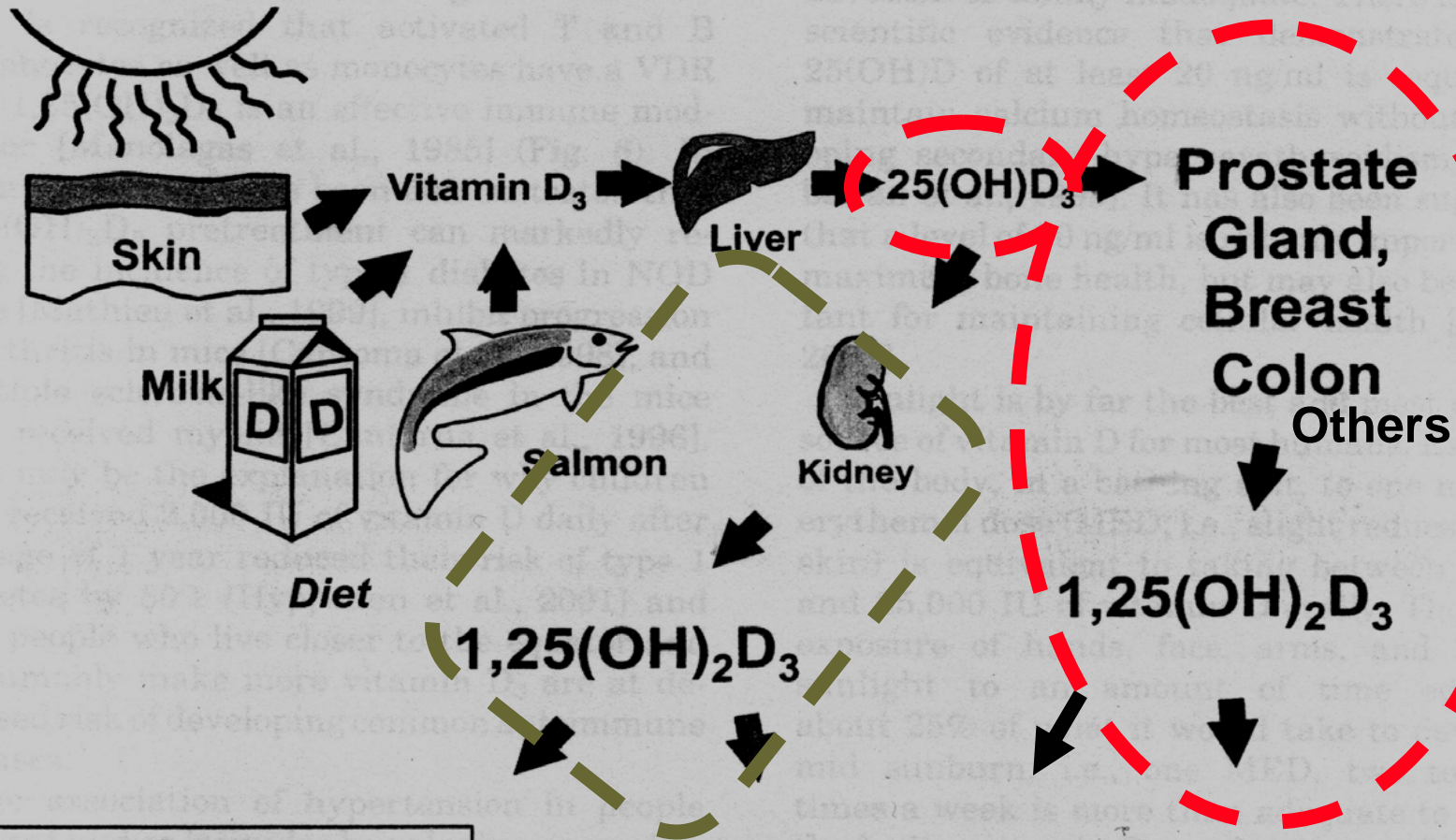
Men & women (50+)

800 IU

Pregnant or lactating women ( $\geq$  18 years)

400 IU

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**Calcium Homeostasis**  
**Muscle Health**  
**Bone Health**

**Immunomodulation**  
 (prevention of autoimmune diseases)

**Regulation of Cell Growth**  
 (cancer prevention)

**Prostate Gland,**  
**Breast**  
**Colon**  
**Others**

**Skin**

**Milk**  
**D D**

**Diet**

**Vitamin D<sub>3</sub>**

**Liver**

**Kidney**

**Salmon**

**25(OH)D<sub>3</sub>**

**1,25(OH)<sub>2</sub>D<sub>3</sub>**

**1,25(OH)<sub>2</sub>D<sub>3</sub>**





# Vitamin D

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Frank deficiency ( $\leq 25$  nmol/L):

- Osteomalacia and rickets
- Myopathy, sway, falls

Vitamin D insufficiency ( $>25$  to  $< 40 - 75$  nmol/L):

- poor calcium absorption
- low BMD
- Fractures (D+Ca – hip RR0.81, nonvert RR0.87)\*
- muscle weakness

# Building a Collaborative RIA Team

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- Lora Giangregorio – bone health
- Bill McIlroy – gait and falls
- Eric Roy – cognition and falls
- Alexandra Papaioannou, Jonathon Adachi, Lehana Thabane – geriatrics, rheumatology, osteoporosis, biostatistics
- Anita Myers – evaluation tools → fear of falling

# Research with the RIA

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- What are potential predictors of asymmetric, unstable and slow gait?
- What are the characteristics of individuals in LTC categorized as having mild, moderate and severe walking dysfunction?
- Can indices of walking competency predict falls prospectively?
- How do indices of walking competency change during dual-task walking?

# Research with the RIA

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- What are vitamin D levels and are they correlated with indices of walking competency?
- What is the feasibility of recruitment and performing gait assessments for a large cohort of ambulatory individuals living in LTC facilities, and evaluating predictors of falls prospectively?

# Research with the RIA

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- What are the physical activity profiles of ambulatory individuals living in LTC facilities?
- What is the feasibility performing remote measurement of daily physical activity profiles for a cohort of ambulatory individuals living in LTC?
- What are the characteristics of individuals in LTC who are categorized by low, moderate or high daily physical activity levels?

# Research with the RIA

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- Characterize fear of falling in ambulatory individuals living in LTC using new tool, and evaluate relationship with indices of walking competency
- Prospective follow-up to see if it predicts falls

# Methodology

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- 120 ambulatory individuals living within RIA
- Walk across a pressure-sensitive mat ~6-8 times
- Chart abstraction of medical history
- 3MS, AFC scale, falls self-efficacy scale

## Optional:

- Provide one blood sample for vitamin D measurement
- Wear a physical activity monitor for part of a day

# Inclusion Criteria

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- Can walk at least 10 metres, with or without an aid
- Aged 65 or older
- Live in 1 of 3 RIA facilities
- Do not have conditions that have impaired their ability to control their walking (e.g. Parkinson's disease, ABI, SCI)

# So What?

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- Results used to inform future intervention studies and falls assessment tools
- Pilot research for physical activity monitors
- Further research supporting use of AFC
- Pilot/feasibility data for future grant applications
- Opportunity to build capacity for collaboration within and beyond UW and the RIA



Questions?